

REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-31 are pending in the present application. Claim 1 is amended by the present amendment.

In the outstanding Office Action, the Information Disclosure Statement (IDS) filed on June 16, 2004 was objected to; the specification was objected to; Claims 1, 12-14, 23-28, 30, and 31 were rejected under 35 U.S.C. §102(b) as anticipated by Kasai (U.S. Patent No. 6,246,705); Claims 1-5 and 7 were rejected under 35 U.S.C. §102(b) as anticipated by Ema et al. (U.S. Patent No. 5,946,334, herein "Ema"); Claims 1, 2, 16, and 18 were rejected under 35 U.S.C. §102(b) as anticipated by Hironari (Japanese Patent JP11-105336); Claims 1-4, 6, 9, 15-17, 20, and 21 were rejected under 35 U.S.C. §102(b) as anticipated by Thompson (U.S. Patent No. 5,444,728); Claims 22 and 29 were rejected under 35 U.S.C. §103(a) as unpatentable over Kasai in view of Kaminishi (U.S. Patent No. 6,618,406); Claim 8 was rejected under 35 U.S.C. §103(a) as unpatentable over Thompson in view of Kaminishi; Claims 10 and 11 were rejected under 35 U.S.C. §103(a) as unpatentable over Thompson in view of Trotter et al. (A CMOS Low Voltage High Performance Interface, Microsyst. Prototyping Lab., Mississippi State University, MS, USA, pps. 44-48, herein "Trotter"); and Claim 19 was rejected under 35 U.S.C. §103(a) as unpatentable over Thompson in view of Canright (Practical Design for Control Impedance, Martin Marietta Electron, Orlando, FL, USA, pps. 370-377).

Regarding the objection of the IDS filed on June 16, 2004, Applicants respectfully resubmit the IDS, modified to include a column for the Examiner's initials, as requested by the outstanding Office Action. Accordingly, it is respectfully requested this objection be withdrawn, and the references filed with the IDS be considered.

Regarding the objection to the specification, the specification has been amended as suggested by the outstanding Office Action. No new matter has been added. Accordingly, it is respectfully requested this objection be withdrawn.

Regarding the outstanding rejections on the merits of the claims, independent Claim 1 has been amended to more clearly recite that a modulation signal generating unit outputs a laser modulation signal consisting of a pair of symmetrical small swing differential signals. The claim amendments find support in Figure 5 and its corresponding description in the specification. No new matter has been added.

Briefly recapitulating, amended Claim 1 is directed to a laser modulating and driving device that includes a modulation signal generating unit and a driving unit. The modulation signal generating unit is configured to generate and output a laser modulation signal consisting of a pair of symmetrical small swing differential signals based on pixel data and the driving unit is configured to drive a laser according to the laser modulation signal output and supplied from the modulation signal generating unit.

In a non-limiting example, Figure 2 shows the laser modulating and driving device 100 having the modulation signal generating unit 120 and the driving unit 170.

Turning to the applied art, Kasai shows in Figure 4 an optical scanning device having a digital to analog converter 132 and a RAMP signal generating circuit 133, each producing a signal provided to a comparator 134.

The outstanding Office Action asserts that the outputs from the digital to analog converter (D/A) 132 and the RAMP circuit 133 (shown as pulses V1 and V2, respectively, in Figure 5A of Kasai) correspond to the claimed pair of small swing differential signals. However, the signals from the D/A converter 132 and the RAMP circuit 133 of Kasai, which are the same as the modulation signals disclosed by Hironari, are different from the claimed small swing differential signals, as discussed next.

In this regard, in both references, a modulation signal is output from a PWM circuit only when the D/A output level is smaller than a triangular pulse ($V_2 < V_1$), based on the comparator's output. Thus, it is respectfully submitted that such modulation signals are different from the claimed pair of symmetrical small swing differential signals.

In addition, the claimed pair of symmetrical small swing differential signals are generated from an LD modulation signal and an inverted LD modulation signal, and this signal pair is output as a modulation signal and transmitted to the driving circuit. However, neither Kasai nor Hironari teaches or suggests the structure recited in Claim 1.

Ema discloses a laser control system having a current driving unit 4 and a semiconductor laser 1. Ema further discloses that "[t]he light output of the semiconductor laser 1 is controlled through the current which is the sum (or difference) of a control current of the negative feedback loop 3 and a driving current generated by the current driving unit 4," at column 2, lines 58-63. Relying on this disclosure of Ema, the outstanding Office Action asserts that the control current and the driving current of Kasai correspond to the claimed pair of small swing differential signals.

With regard to Thompson, Thompson discloses a laser driver circuit having a switch driver 32 that generates signals D1 and D2. The outstanding Office Action asserts that signals D1 and D2, which are input from the switch driver 32 to a bias switch as shown in Figure 7, correspond to the claimed pair of small swing differential signals.

However, the signals disclosed in both Ema and Thompson are not modulation signals *generated from pixel data* as required by amended Claim 1.

Accordingly, it is respectfully submitted that independent Claim 1 and each of the claims depending therefrom patentably distinguish over Kasai, Hironari, Ema, and Thompson, either alone or in combination, because neither of these references teaches or

suggests a modulation signal generating unit configured to generate and output a pair of symmetrical small swing differential signals based on pixel data.

Regarding independent Claim 23, the outstanding Office Action asserts that the structure shown in Figure 2 of Kasai, in which a block 20 including a modulation unit and a block 10 including a driving unit are connected to each other by a transmission line 30, corresponds to the claimed pixel data unit and modulation signal generating unit formed together in a same first block and the driving unit formed in a second block.

However, in Kasai, a PWM signal output unit 13 and a driving circuit 11 are formed in the same block 10, which is different from Claim 23. The same arguments are valid for independent Claim 30.

Accordingly, it is respectfully submitted that independent Claims 23 and 30 and each of the claims depending therefrom patentably distinguish over Kasai.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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